the usual finding with fixed eruptions. This observation would support the idea that hypersensitiveness in these cases is not in the epidermis and superficial part of the cutis, but is in the deeper layers of the skin.

TREATMENT

These eruptions usually involute rapidly on withdrawal of the offending drug, and no treatment is necessary other than a mild antipruritic, as calamin zinc lotion. Occasionally, in the more severe forms, active treatment is necessary. Johnson[16] and Sanderson[17] have reported good results with the intravenous injection of large amounts of 5 or 10 per cent glucose. A 4 per cent solution of sodium bicarbonate has also been used intravenously when large doses of the barbiturates have been taken.

SUMMARY

Skin eruptions due to the barbiturates are common. Any barbituric acid derivative is capable of producing the different cutaneous reactions which have been described. These reactions are urticarial, erythematous, bullous, eczematous, and fixed.

A case is reported of a fixed eruption due to amytal. Further observations on this patient showed that only the barbiturates with the ethyl-barbituric acid radical would reproduce the eruption.

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DISCUSSION

HARRY E. ALDERSON, M.D. (490 Post Street, San Francisco).—I have seen numerous examples of eruptions due to all the drugs mentioned, excepting amytal. As I prescribe amytal a great deal in small doses, for the relief of pruritus, I may some day see a case of dermatitis medicamentosa due to this drug.

❦

STANLEY O. CHAMBERS, M.D. (826 Roosevelt Building, Los Angeles).—This particular subject, dealing with drugs so commonly employed in general medicine, seems most apropos. It is appreciated by the author that cutaneous reactions of the common order are familiar to most of us. The intriguing portion of the presentation deals with a fixed eruption. This picture is infrequently identified, and yet relatively common. The discusser has witnessed such lesions about the scrotum and anal region, considered as recurrent scrotal eczema and pruritus ani. These lesions appeared in direct proportion to the ingestion of the drug, and disappeared with its withdrawal. Recurrence was always at the same site. Greater consideration of such possibilities should increase therapeutic effectiveness.

Doctor Novy is to be complimented for his interpretation of such an unfamiliar dermatitis.

❦

PHILIP K. ALLEN, M.D. (314 Medico-Dental Building, San Diego).—The widespread use of many different barbiturate derivatives and the inevitable intolerance exhibited by some individuals to their use, make the subject an important one.

I think that the fixed eruption is the most interesting type of the drug idiosyncrasies. Its exact place in the field of hypersensitive reactions is still a debatable point. The reaction is not only independent of any circulating antibodies (as shown by the absence of the Prausnitz-Kustner phenomenon), but is confined strictly to certain groups of the fixed tissue cells. Similar tissue outside the reacting areas fails to exhibit the phenomenon, so that cutaneous tests are of little significance except in the areas previously involved.

An interesting feature of Doctor Novy's case is the degree of specificity shown to a certain type of barbiturate derivative. It is frequently of great value to know that a hypersensitivity to one type of drug does not imply that related substances will produce the same reaction.

ACUTE GONORRHEAL ARTHRITIS COMPLICATING PREGNANCY*

By JOHN R. UPTON, M.D.
San Francisco

DISCUSSION *by Karl L. Schaupp, M. D., San Francisco; Frances Baker, M. D., San Francisco; William Benbow Thompson, M. D., Los Angeles.*

THE comparative rarity of acute gonorrheal arthritis complicating pregnancy, and the peculiar problems which arise in its treatment during the pregnant state, warrant a consideration of the subject, a review of the literature, and the reporting of a case. The "Index Medicus" for the last ten years contains no articles on this subject.

LITERATURE

Lindermann,[1] in 1892, appears to have been the first man to connect the gonococcus with the resultant complicating arthritis. Jundell,[2] in 1894,

* By permission of the San Francisco Public Health Department, Dr. J. C. Geiger, director.
From the Department of Obstetrics and Gynecology, University of California Medical School.

and Aehman,[8] in 1897, recovered the gonococci from infected tendon sheaths. Edgar,[4] in his 1903 volume of Obstetrics, makes no reference to the gonococcus during pregnancy, but does state: "The etiology (puerperal septic arthritis) is evident from the pathology. It has been seen, however, as the result of gonorrheal infection. There is always considerable danger of destruction of the joint and of permanent anchylosis and loss of function." Webster,[5] in 1907, only says: "It (gonococcus) may be carried to distant parts, *e. g.*, joints, endocardium, and pleura, and set up pathological processes. The marked liability of pregnant and puerperal women to acute gonorrheal infection must be noted; and also the tendency to development in these states of an acute exacerbation of what was previously a slight infective inflammatory process. Thus a latent condition may develop into an acute outbreak in pregnancy, or in the puerperum, without any fresh infection from without." Lea,[6] and Taussig,[7] and Harrar,[8] likewise made further advances in the study of the gonorrheal organism as a causal factor in arthritis. DeLee,[9] in 1915, briefly calls attention to the increased vascularity and succulence of the vaginal tissues, and the appearance of the vaginal mucosa when infected. Royston,[10] in 1923, reported four cases of pregnancy complicated by gonorrheal arthritis; these were the first histories I could find reported in the literature, and I shall have occasion to refer to them more fully later. Williams,[11] in 1926, in his volume on Obstetrics, stresses the rôle played by the gonococcus during the puerperium, but makes no mention of any complicating disorder during pregnancy.

DIAGNOSIS

Diagnosis[12,13] should present few difficulties. The question of pregnancy is usually self-evident. A characteristic history for gonorrhea from the husband, wife, or both, may or may not be elicited. The gonorrheal infection responsible for the acute arthritis appears to be most frequently acquired after conception takes place.[10,11] The isolation [14,15] of the Neisserian organism from the vaginal tract leaves no possibility of doubt—if the smears have been prepared by the use of Gram's staining technique. On this well-known clinical picture of gonorrhea, and usually within four weeks' time, is superimposed a rather suddenly severe fever, chills, some prostration, sweats, shifting pain in the skeletal articulations, swelling of the joint capsules and adjacent tendon sheaths, with final permanent localization of this acute pain in some one or more skeletal junction. In a few patients where repeated vaginal and cervical smears are negative for the Neisserian cocci, or, in patients who are too close to term to warrant the vaginal manipulation incident to the cervical visualization, the complement-fixation test is of real assistance in establishing a diagnosis; the test should be routinely performed. Intradermal tests with the gonococcal filtrates are not specific and, therefore, they are misleading.

Many physicians, in order to establish a diagnosis, aspirate some fluid from the affected joints or tendon sheaths, but this procedure, I believe, is attendant with considerable risk to the patient. The gonococcus organisms are difficult to culture and isolate from such aspirated fluid, even though the joint spaces are washed carefully, and the resultant liquid centrifuged. The possibility of a secondary infection makes a seemingly simple procedure fraught with danger. The above questionable diagnostic procedure is nullified, however, when an acute purulent tenosynovitis occurs; for in such a case the treatment is surgical incision and drainage.

SOME GENERAL CONSIDERATIONS

A few general considerations must be disposed of first, for certain pertinent side issues continually creep into the discussion and refuse to be ignored. The pregnancy must be considered as a complicating factor. The period of gestation is of importance; Royston's[10] four cases all developed their acute arthritis in the latter half of pregnancy, and my reported patient was in the twenty-ninth week of pregnancy; therefore, from the few reported cases the impression is obtained that the arthritic manifestations occur in the last trimester. Earlier writers[4,5] believed that many spontaneous abortions occurring in the first trimester were caused by a gonorrheal infection, with the disease being contracted at or shortly after impregnation occurred. This infection, they believed, caused an endometritis and deciduitis which, if severe enough, would precipitate an abortion. The presence of a fetus complicates matters greatly, but suffice to say that, if it is possible for the patient to carry through to term, so much the better for the ultimate results. Any mechanical interference in the earlier months of pregnancy through the vagina, in order to induce an abortion, will unseal the route to the abdominal cavity. This permits the causal gonococcus an opportunity to initiate, and form the tubo-ovarian and pelvic manifestations so familiar to all gynecologists.[12,13] Astrinsky and Grinner[16] report 30 per cent of complications when induced abortion occurred in their series of cases of gonorrhea. Gonorrheal arthritis is sown by an infected blood stream. Contiguous invasion from the infected Bartholin, Skene, and cervical glands is usually prevented after conception by natural cervical barriers, but if these are destroyed by surgical or criminal interference the utero-tubo-abdominal passageway is again patent. Another cautioning factor against indiscriminate therapeutic abortions is the strong possibility of a secondary invader obtaining a foothold in the excellent pabulum created by the unavoidable trauma incident to the surgical interference. The most-feared organism is the hemolytic streptococcus.[17] The resultant infection would also be augmented by the general lowered body resistance of the patient due to the infective arthritis.

The available evidence indicates that the acute infectious process is due to the gonorrhea having been contracted after conception occurred. An old gonorrheal infection frequently prevents fertilization by occluding the fallopian tubes, while if the disease is localized in the lower genital tract, attenuation of the cocci may result. Williams[11] states that many puerperal fevers are flare-ups of a qui-

escent antepartum infection. The diminished virulence might be the result of conservative treatment if recognized, or again it might be the reaction due to an increased resistance on the part of the maternal body defenses. When postconceptional in character, the invading organism is fresh and virulent, while the maternal tissues, being succulent and hypervascular due to the pregnancy,[9] offer an excellent medium for multiplication and for possible invasion; trauma to the vaginal mucosa or the cervix abets the infection. Several investigators[18] have shown that pregnancy increases the resistance of the maternal body to disease; were it not for this fact[19] many more women would present the acute gonorrheal arthritic symptomatology. As it is, the disease is rare, whereas vaginal gonorrheal infections during pregnancy are quite common;[16,20,21,22] Taussig[7] reported 5 to 10 per cent, Royston[10] 3 per cent, and Rorke[22] 16 per cent of their clinical patients.

TYPES

Acute gonorrheal arthritis is either monoarticular or polyarticular. Multiple joint involvement appears most frequently; this fact is rather fortunate, for when one joint alone is diseased the course is frequently stormy, as an inflammation of the tendons and tendon sheaths may take place, and a high percentage of cases progress into a purulent tenosynovitis. If a purulent tenosynovitis supervenes, the original condition must be subordinated until adequate surgical measures[23,24] have cleared away the septic infection between the tendons and delicate sheaths. Frequent, minute examination of all involved joints and adjacent tendons is mandatory to circumvent such a chain of distressing events.

The Neisserian organism appears to have a predilection for the upper extremities in women, and for the lower members in males. The wrists, elbows, metacarpal and phalangeal joints, shoulders, sternoclavicular articulations and knees are attacked most frequently in women. Complete ankylosis of one or more joints is the most fearsome aftermath, and the condition to be guarded against. Royston[10] tells us that all four of his cases suffered some permanent damage; Kanavel[25] warns against the possible dire results after a gonococcal arthritis. A vexing question is the problem of splinting the involved members; there is a wide diversity of opinion as to whether splints are necessary.

TREATMENT

Nature immobilizes diseased articulations and tendons rather effectively, but we can aid and encourage nature, and at the same time provide more comfort for the patient. When the elbow or wrist is involved—and these two constitute the commonest sites—logical treatment, based on anatomical considerations, is to apply a posterior arm supportive plaster splint with the elbow held in the mid-flexion attitude, the forearm in midsupination, and the wrist assuming a slight dorsiflexion. This type of support is easily removed so that passive and active massage may be instituted at the proper time.[25] Involvement of distal extremities, likewise, demands adequate support of the involved members. The physician should be rather cautious, however, for splinted patients may rely overly much on this artificial rest, with the resultant freedom from discomfort. Atrophy of muscle groups, tenosynofibrosis, and sometimes bony ankylosis takes place, a truly dire catastrophe. Splint if necessary, but always encourage the patient to move her involved members within the angle of painless motion when the splint is removed. This slight activity will stimulate peripheral circulation, prevent marked muscle wasting, prevent and break up tendon adhesions, and will greatly lessen the danger of joint fixation. When these patients first present themselves for treatment, roentgen-ray studies of the affected joints should be taken, for then we have valuable comparison films for use at a later date. Films frequently show involvement of the bone in the form of an osteitis; therefore, interval pictures will shed necessary information on the progression or retrogression of the disease. This being so, the roentgen films constitute valuable adjuvants in the treatment of the patient, for by their interpretation of the bony lesions the calcium-phosphorus therapy can be intelligently administered. We should not forget that such records are also medico-legal safeguards for the doctor.

Sagging, pendulous breasts require support. A snugly fitted uplift brassiere will give great relief. My patient complained bitterly about her heavy breasts resting on the extremely tender bicep muscles, but when the pressure was relieved by an uplift brassiere she instantly remarked on the improvement. A minor point, but one which the patient heartily welcomed.

The heart, like a good campaigner, frequently takes care of itself, but it behooves the physician to protect it throughout the tedious illness.[26,27] If the heart has been damaged by former infections, greater watchfulness is necessary, for the high fever and toxic condition multiply the work of the organ many times. Bodansky[28] says that an increase of one degree centigrade in the body temperature causes a rise in metabolism of about 13 per cent. Lewis[29] says that "rest is essential until active mischief is no longer suspected; an object of rest is to avoid strains of joints or increased work of the heart that may help to light up active trouble; return to exercise must be very gradual." The friendly counsel of a cardiologist is warmly appreciated in dealing with such a damaged heart during pregnancy[30] when other contributing factors are present.

RECENT THERAPEUTIC MEASURES

Modern therapeutic measures directed against gonorrheal arthritis in the nonpregnant state are now uniformly effective.[31-34] When, however, we are forced to deal with a pregnant woman suffering with an acute gonorrheal arthritis, we must of necessity modify one of the newest and most effective weapons in the therapeutic armamentarium, *i. e.*, hyperpyrexia or hyperthermia. Under

the heading of hyperpyrexia, I shall only include:

1. Hypertherm cabinets. The air-conditioned hypertherm cabinet is perhaps the best of the present-day apparatus, but as yet I believe it has not been manufactured commercially. Hench, et al.,[31] report of this machine that, "of patients with gonorrheal arthritis, well over two-thirds are promptly cured, and practically none go without considerable relief." Owens [32] says: "Given patients who can and will take the treatment, better than 80 per cent of gonococcic infections, regardless of complications, may be absolutely cured in the space of two weeks."

2. Diathermy.[35-40]

(*a*) Contact metal electrodes.

(*b*) High frequency alternating electric field.

(1) Cable and coil; double cuff.

(2) Electric-field electrodes.

(3) Glass or composition, air-separated electrodes.

(*c*) High frequency electromagnetic field.

3. Hydrothermia.[41-43] Total or partial immersion can be used. Various clinics advocate varying degrees of heat, and different methods of application.

4. Nonspecific foreign protein therapy. In this group, typhoid vaccine given I. V. has had the stellar rôle. Cecil, Friess, et al.,[44] report disappointing results with malaria. Sterile milk injections [45] are not without danger to the patient.

Systemic hyperthermia should not be used for the pregnant patient suffering from acute gonorrheal arthritis, since the products of conception always suffer, and death of the fetus may occur when the body temperature is elevated, and sustained for any period of time. This fact is demonstrated by the many intra-uterine deaths caused by the various organisms which have, as one of their manifestations, the disturbance and elevation of the heat-regulatory mechanism. Pneumonia is an example. It is possible to modify some one of the above hyperthermic methods, but the physician must realize fully that the sensitive heat-regulatory centers in the gravid patient will tolerate less interference, and that the line of demarcation between the normal and pathological is more obscure. Local hyperthermic measures will give some certain relief, but, as Harrison [46] trenchantly puts it, "The primary focus of infection should be treated first, then measures are instituted to sterilize the blood stream, and the joints are treated last of all." Here diathermy produces beneficial results.

It might be advisable here to inject a word of warning, as it has been shown that the improper usage of short-wave diathermy machines is not without real danger.[35,36,47] Cartilage is devoid of circulation and sensation, possessing neither protecting nerves nor cooling blood vessels. If injured, articular cartilage has no power of regeneration, and little power of repair.[48] When short-wave diathermy machines are used, particularly referring to the double-cuff application method, the above warning is real. Deeper tissues sustain higher temperature rises, so that if, for instance, the knee joint is under treatment, the physician must be aware of the irreparable damage he may inflict to the articular cartilage of the knee. Some knowledge of electricity and physics is essential. Cardiac collapse, embolic phenomenon, hemorrhagic encephalitis, vascular collapse, and deterioration and hemorrhage of the suprarenal glands have all been encountered by those who have used this newer method of fever therapy.

Extremely gratifying results are frequently encountered when local roentgen-ray therapy is carried out by a competent roentgenologist.[49,50] Adequate screening [51] of the pelvic contents to avoid fetal and maternal damage is, of course, mandatory. Indiscriminate use of these roentgen rays might only show their harmful effect in later generations. Our reported patient responded more quickly to local x-ray therapy than to any other treatment; we were most favorably impressed with the results obtained.

In evaluating the results obtained by any of the hyperthermic methods we should realize that it is the production of heat, and heat alone, that aids; so far as now known, there is no specific bacterial action other than that produced by the increased rise of temperature.[37]

Chemotherapy has its staunch partisans and equally fervent opponents. I have not used this debatable form of treatment.

In regard to drugs, as with the hyperthermic measures, we are again confronted with the inevitable question, will the fetus suffer damage? Naturally, the mother's life must not be jeopardized nor her pain left unrelieved for want of administering necessary sedatives or analgesics. The salicylates, opium derivatives, quinin, and the cinchophens, judiciously used, will give considerable relief. Weak links in the maternal chain must be constantly sought for. Irritative drugs are prone to hurt an already damaged kidney; therefore, a daily urinalysis is indicated to pick up the first signs of a nephritic condition.*

Multiple small blood transfusions and intravenous 10 per cent dextrose are excellent supportive measures; especially is this true during the high-fever stage.

OTHER THERAPEUTIC FACTORS

A brief listing of certain other cogent factors which will intrude themselves for solution are: the eradication, if possible, of the primary source of infection and the cleansing of other nonspecific foci of infection; the choosing of a diet rich in vitamins and supplemented with some form of easily assimilated iron—trays which tempt the appetite and do not repulse; the approaching problem of vaginal delivery versus cesarean section; if the birth is per vaginum, to safeguard the child's eyes by adequate treatment, and if the baby is a female, to recall that the vagina of the new-born girl may be infected during the descent via the maternal birth canal; the baby should be bottle-fed from the start, to prevent any possibility of infection from the mother to the child, etc. Lamb [52] says that there is

* I am now studying the effect of prontosil and prontolyn in relation to the above condition, and hope that I may be able to report the results later.

a short period during and after birth when the vaginae of female babies are difficult to infect with the gonococci, due to the influence exerted by the theelin contained in the maternal blood. If this is true, it would partially explain the relative rarity of gonorrheal vaginitis in the new-born baby girls, even following breech deliveries.

PROGNOSIS

A favorable prognosis depends, necessarily, on various pertinent factors, but we may postulate: that if the bony destruction is minimal, and the angle of movement only partially restricted; if the heart has not suffered additional damage; if the kidneys function satisfactorily; if the primary source of infection has been adequately treated, and, finally, if the patient comes through the ordeal of labor successfully, then we may reasonably hold out the promise of a complete cure.

All patients should be followed for varying intervals after their discharge from the hospital, for ambulatory treatment is always necessary. A prolonged convalescence, abetted by a general building-up regimen, spells for greater end-result success.

REPORT OF CASE

A case of acute gonorrheal arthritis complicating pregnancy is hereby summarized:

Mrs. G. B., a primiparous white American housewife of twenty-two, entered the San Francisco County Hospital on August 29, 1935. Her complaints were: Severe upper extremity joint pain and stiffness for six days' duration. She had never attended a prenatal clinic.

Past History.—Resided in San Francisco for the past year. Previous to that she resided in Illinois, where she was born. She drank a moderate amount of alcohol up to the time she became pregnant. She had no menstrual irregularity until she became pregnant. L. M. P., January 11, 1935. E. D. C., October 18, 1935.

Present Illness.—One and a half months prior to entry she first noticed a vaginal discharge which gradually became worse, and quite profuse during the past two weeks. Her husband had had gonorrhea. Was treated; no urethral discharge for some weeks. One week previous to hospital entry she noticed stiffness of back, neck, shoulders, legs, ankles, toes, and fingers; any movement was attendant with great pain. Two days later the stiffness and pain became localized in the elbows, which became slightly swollen and exquisitely tender.

Physical Examination.—Temperature was 100 degrees Fahrenheit, pulse 130, respirations 22. A young woman, who cringed and whimpered if any attempt was made to examine her arms.

The skin was moist and pale, and the excessive perspiration necessitated frequent changes of nightgowns. Generalized flea-bites. Heart sounds not unusual, rate 130; blood pressure, 125/85. Uterine fundus was 25 centimeters above the S. P. Position of fetus R. O. T. sounds regular, but rapid—at 160 per minute. The child's head settled in the pelvis. Pelvic mensuration was within normal limits. The arms were held in half-flexion; shoulders, elbows, and wrists were exquisitely painful; some swelling at joints. Any attempt to examine the patient caused her to cry in an hysterical manner. There were no signs of a purulent tenosynovitis.

Laboratory Work.—Urethral and cervical smears were positive for neisserian intracellularis.

Complement-fixation test was positive. Wassermann, negative.

Sedimentation time was eight minutes. Blood: Hemoglobin, 80 per cent; red blood cells, 4,830,000; white blood cells, 12,400; polymorphonuclears, 78 per cent; lymphocytes, 22 per cent; type two, Moss.

X-ray report showed osteitis of both margins of the symphysis pubis, both wrists and elbows.

Urine: Catheterized specimen showed many bacteria, but otherwise negative.

Diagnosis.— Pregnancy, intra-uterine, seven months. Acute polyarticular arthritis, neisserian. Gonorrhea, subacute—skenitis, specific; cervicitis, specific. Tenosynovitis, bilateral wrists and elbows.

Treatment.—Absolute bed rest. High vitamin diet supplemented with cod-liver oil and iron. Massive hot compresses applied four times a day, from fingers to shoulders, with slight decrease of pain. Later on, local hot bakes by use of electric cradle; poor result. The arms were supported with slings at first; later, posterior splints were applied, with great relief to the patient. Gentle massage to arms and shoulders three times a day, using oil of wintergreen. Fluids forced to 4,000 to 5,000 cubic centimeters per day. One ounce of 6 per cent mercurochrome was injected into the vagina once every three days. Acetyl salicylic acid, sodium salicylate, and phenobarbital were the only drugs used.

Five intramuscular injections of gonococcus filtrate were given, with only slight decrease of pain. The initial dose was 0.05 cubic centimeters, the last and largest dose was 0.5 cubic centimeters.

Nine intravenous injections of typhoid vaccine with the initial dose of ten million, and the final dose of five hundred million. After the first injection the temperature rose to 101.6 degrees Fahrenheit; this was the highest elevation during the course. The second I. V. injection of vaccine was always given within half an hour after the primary rise; injections were given every other day. After the eighth injection the fetal heart became irregular and weak in quality; when this irregularity was again repeated after the ninth treatment, it was deemed advisable to stop the vaccine medication. The clinical response to this form of therapy was disappointing.

Six roentgen-ray treatments to the shoulders, elbows, and wrists were given before the patient delivered. Total dosage to each of the three mentioned areas was 450 r. When the patient returned to the ward after each exposure, she would always comment on the marked decrease of pain, and she stated, when she left the hospital, that the x-ray treatments had given her more relief than any other measure.

After the first eight days of her hospital stay, the swinging temperature dropped to a normal level and did not rise again until the intravenous typhoid vaccine therapy was administered.

Spontaneous labor pains began at 7:30 a. m., and at 10:14 p. m. of the same day, October 26, 1935, she spontaneously delivered a normal female baby. The patient was unable to use her arms to assist herself during the second stage of labor, and it was necessary to keep her under heavy pentobarbital sedation to relieve the arthritic pain in the arms, which was augmented by the labor pains. The female baby showed no congenital defects. Especial attention was paid to the eyes and the vagina, to prevent a contact gonorrheal infection.

Course.—During the third, fifth, and sixth days postpartum, she ran a slight fever; the highest point being 100 degrees Fahrenheit on the third day, after which time the slight temperature rather quickly returned to a normal level. Although she lost very little blood during the delivery, estimated at 250 cubic centimeters, the blood picture, postpartum, showed the following changes:

October 27, 1935—Hemoglobin, 75 per cent (Sahli); red blood cells, 3,500,000; white blood cells, 7,900.

October 30, 1935—Hemoglobin, 55 per cent (Sahli); red blood cells, 2,250,000; white blood cells, 6,600.

November 5, 1935—Hemoglobin, 55 per cent (Sahli); red blood cells, 3,600,000; white blood cells, 7,600.

A transfusion of whole blood was started, but the patient complained so bitterly (ankle vessel had to be used) that the transfusion was terminated after 100 cubic centimeters had been run in.

After a five weeks' convalescence, she was discharged to the University of California Out-Patient Clinic for physiotherapy and for anti-gonorrheal treatment. On discharge she still presented some moderate restriction of movement of the left elbow and wrist, but the right arm had full and free motion; her general condition was fair; mental state was excellent. The uterus was found to be in a third degree retrodisplaced position and quite painful to move. The

hemoglobin content was only 55 per cent (Sahli), and the red cell count was 3,600,000.

SUMMARY

Presenting a few facts and ideas relative to the diagnosis and treatment of acute gonorrheal arthritis complicating pregnancy.

A successful outcome for the mother and child is dependent on the drastic modification of modern medical therapeutics. The presence of a fetus excludes several of our most efficient measures from the course of treatment. Especial emphasis is directed to the narrow margin of safety in relation to the use of medicinal and hyperthermic procedures when confronted by this rather rare disease condition.

A recent case report is presented for illustration.

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DISCUSSION

KARL L. SCHAUPP, M.D. (490 Post Street, San Francisco).—Acute gonorrheal arthritis complicating pregnancy is so rare that, in eighteen years at the San Francisco Hospital, the patient described by Doctor Upton is the only one I know to have been admitted for that condition. Personally, I have never had the opportunity to treat such a patient.

The patients that we see more often are those who flare up postpartum where there is not the complicating factor

of a living fetus. I believe the use of hyperpyrexia as a means of treatment to be dangerous to the fetus, as is shown by the number of premature labors with a high fetal mortality rate in patients who are suffering from pyelitis or other conditions with which high temperatures are associated.

Doctor Upton's discussion mentions the many patients who are known to have local infection, as shown by positive smears at some time during the prenatal period. It reminds us again of the need of vigorous treatment of all these patients, so that the local condition may be cleared up before there is systemic invasion.

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FRANCES BAKER, M.D. (University of California Hospital, San Francisco).—It is very gratifying to read such a paper as this in which the subject is so carefully approached from every angle. There are a few points, however, upon which I wish to enlarge slightly, or to emphasize.

Nature does immobilize involved joints, the muscles contracting into marked spasm where pain is acute. Usually, however, the position assumed is bad. The shoulder is adducted, being held close to the side so that abduction and rotation are very difficult to obtain. If the shoulder is splinted in abduction at 80 to 90 degrees, with some external rotation, movement is much easier to obtain as pain decreases and pain is less where spasm can be relieved. The elbow is usually held flexed and pronated. If it fuses in this position, it is of little value; whereas even a stiff elbow held at 90 degrees in midposition between pronation and supination is valuable. A patient holds the wrist in palmar flexion, while dorsiflexion is necessary for grasp. Hips and knees will be flexed and feet extended, if permitted to remain in positions of comfort, while traction and splinting relieve strain and place joints in positions of least deformity.

This orthopedic care is necessary and must be done early and not left, as Doctor Upton has quoted Harrison[46] as saying, "until the last." Orthopedic care can be carried on while search for infection is being made, and while the blood stream is being sterilized.

I am glad that Doctor Upton has stressed the point that short-wave diathermy is not without danger. Diathermy is of value, but it is not a cure-all, as many seem led to believe. There is no point in using diathermy when radiant heat is as effective or even more so. It should never be used where there may be hemorrhage, as in pregnancy, during the menstrual period, where ulceration exists, etc. Diathermy is a valuable asset, but must be used as carefully as one does potent chemicals.

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WILLIAM BENBOW THOMPSON, M. D. (803 Wilshire Medical Building, Los Angeles).—It is extremely difficult to add anything of value to the excellent summarization concerning the treatment of gonorrheal arthritis.

Unfortunately, the addition of pregnancy largely prevents the use of the various hyperthermia methods, since the maintenance of fever would probably destroy the pregnancy and, with the casting off of the dead fetus, open an avenue through which the organism could progress into the uterus and its appendages. It is possible that the judicious employment of hydrothermia might give satisfactory results, especially since Pettit has recently pointed out that sterilization of the active focus can be effected almost as certainly with repeated small febrile reactions as with the prolonged temperature elevations obtained in electrical cabinets. This is, however, no more than a conjecture and, since Upton has so clearly evaluated the beneficial results of other agents, it would seem inexpedient for the present to attempt other than the therapy outlined. Fortunately, the combination of pregnancy and gonorrheal arthritis is extremely rare. With a satisfactory result obtainable by one mode of treatment, there is little justification for experimentation unless this be well within the bounds of safety.

In my opinion, the only agent which should be subjected to further investigation is the effect of sulfanilamid, and for that reason alone I might wish that Doctor Upton would have further opportunity for study of this perplexing problem.

THROMBOCYTOPENIC PURPURA HEMORRHAGICA*

BLOOD STUDIES DURING INFECTIONS AFTER SPLENECTOMY FOR THROMBOCYTOPENIC PURPURA HEMORRHAGICA (INFECTIOUS ORIGIN)

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DISCUSSION *by T. S. Kimball, M. D., Glendale; Robert E. Ramsay, M. D., Pasadena.*

BLOOD studies before and after removal of the spleen have been made by a large number of investigators, but the literature fails to reveal blood studies during infections after splenectomy for thrombocytopenic purpura hemorrhagica (hemorrhagic thrombopenia). However, the relation of the spleen to the defense mechanism of the body against infection is not a new idea. The spleen has long been known as the possible chief organ of the body's immunological forces. Giffin and Holloway,[1] McLean et al.,[2] and others, have called attention to the frequent occurrence of infections, both before and accompanying the onset of thrombocytopenic purpura. That fatal infections occur after splenectomy has been shown by many writers; for instance, one of Wollstein's[3] patients ("N.V.") died of a pneumococcic meningitis sixteen months after splenectomy. It is my purpose to call attention to the infections occurring after splenectomy, and particularly to the changes seen in the cellular elements of the blood in a case of thrombocytopenic purpura.

REPORT OF CASE

G. S., a boy, five and one-half years old, complained, on January 9, 1935, of a sore throat. His mother thought he had fever. He went back to school in three days. Past history up to this time was negative.

The sore throat and fever returned on January 15, and the cervical lymph glands became markedly enlarged and tender. When his physician was called, on the 18th, he had also developed a bright-red macular rash over the face, neck, and thorax, which soon spread over the whole body and then rapidly disappeared. No peeling of the skin followed the disappearance of the rash. His temperature ranged from 102 to 104 degrees. The condition subsided in several days, and he was up and around the house on the 28th.

He then developed, on February 2, a left otitis media. Permission to do a paracentesis was refused until the 6th. Following the paracentesis, improvement was continuous until February 9, when he had a severe epistaxis, and another on the next day. Purpuric spots were found on the skin overlying the sternum on the 11th. Thereupon he was moved to the hospital.

The temperature was 102.6; pulse 120; and within the next twelve hours the purpuric spots had appeared over the whole body. The epistaxis continued. Blood examinations showed 3,000,000 red cells; 60 per cent hemoglobin; 10,300 white cells with 82 per cent neutrophils, 13 per cent lymphocytes, and 5 per cent large mononuclears. The platelet count was 122,000; coagulation time was nine minutes; clot retraction in five and one-half hours; and the fragility test was maximum at 0.38 per cent, and minimum at 0.34 per cent.

A diagnosis was made of symptomatic purpura hemorrhagica.

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